REMARKS

Applicants thank the Examiner for thoroughly reviewing the application.

Rejection of claims 1-129 under 35 U.S.C. §101

Claims 1-129 stand rejected under 35 U.S.C. §101 as being directed toward non-statutory subject matter. The Office Action stated that the independent claims (1, 32, 63, 94, 98, 101, 106, 110, 113, 118, 122, and 125) recite no clearly defined practical application, nor do they draw a conclusion as to the final end result of the claimed method. Applicants respectfully traverse this rejection. The invention as claimed in claims 1-129 involves manipulating data relating to a tangible thing (a signal) and serves a concrete, tangible, useful purpose (separating deterministic and random causes of signal distortion).

Applicant's prior response argued that the invention recited in the claim achieves the concrete, tangible, useful purpose of separating deterministic and random causes of signal distortion. See Amendment and Response, pp. 22-23; MPEP 2106(IV)(B)(2)(b)(ii) (8th Edition); State Street Bank & Trust. The final Office action, however, asserted that this concrete, tangible, useful purpose is not recited in the rejected claims. (See page 10 of Office Action dates 10/21/03, second paragraph.) Applicants have amended independent claims 1, 32, 63, 94, 98, 101, 106, 110, 113, 118, 122, and 125 to specifically recite "separating deterministic and random components of signal distortion."

Signals are tangible, concrete subjects which may be usefully measured and analyzed. The claimed method/apparatus/article of manufacture manipulates data that is descriptive of a real thing - a physical signal. It solves a real world problem — separating deterministic and random causes of signal distortion. Applicants submit that the amended claims comply with 35 U.S.C. § 101 and respectfully request reconsideration and withdrawal of this rejection.

Rejection of Claims Under 35 U.S.C. §102(e)

Claims 1-5, 8, 9, 32-36, 39, 40, 63-67, 70, 71, 94, 95, 98, 99, 101, 102, 106, 107, and 110, 111, 113, 114, 118, 119, 122, 123, 125, and 126 were rejected under 35 U.S.C. §102(e) as being anticipated by United States Publication 2003/0004664 (Ward). Applicants respectfully traverse this rejection.

Ward

Ward teaches a jitter separation method based on spectrum analysis using histograms. See Ward ¶ 0030. Ward explains that "The subject invention, a jitter separation method based on spectrum analysis, will be described with respect to FIGS. 5 through 11." Id. FIG. 5 teaches a "spectrum approach" that uses histograms. Ward ¶ 0031. Ward Figure 5 shows in step 510 the application of a Fast Fourier Transform (FFT) to the Total Jitter Time Train to produce a Total Jitter Spectrum 520 which is shown in Figure 6. The Random Jitter (RJ) shows up as low-magnitude noise near the X-axis. See Fig. 6. Ward describes that "[t]he DJ-only spectrum can be recovered by setting to zero all those bins from the TJ spectrum that are attributable to RJ (step 560)." Ward ¶ 0037. The histograms are manipulated to separate the Random Jitter and Deterministic Jitter components, and then convolved to produce a "recovered histogram of total jitter" (¶ 0046) which is "interpreted as the PDF [probability data function] of the TJ [total jitter]." A "bathtub" curve" is obtained from the PDF. ¶ 0046 "Based on the bathtub curve, an eye opening can be estimated for a given bit error rate." ¶ 0046.

Claim 1

Claim 1 recites: A method of separating deterministic and random components of signal distortion, comprising the steps of:

(a) collecting data from a data signal;

(b) constructing a probability density function based on the measured data such that the probability density function defines a distribution, wherein the

probability density function is a convolution of deterministic functions and random functions;

(c) constructing a probability density function based on a convolution model having three or more parameters wherein at least one of the parameters are unknown, the convolution model having a deterministic model and a random model;

(d) determining unknown parameters by using a deconvolution process employed upon the probability density functions constructed in steps (b) and (c).

The final Office Action stated that Ward teaches part (d) of claim 1 at Fig. 1 and paragraphs 0018, 0020, and 0036-47. In the Response to Arguments, the Office Action stated that Ward discloses a deconvolution process that is employed upon probability density functions, citing Figs. 6 and 7 and paragraph 0036. Applicants respectfully traverse and submit that Ward at least fails to teach or suggest part (d) of claim 1.

Part (d) of claim 1 requires employment of a deconvolution process on two (or more) probability density functions. In contrast to claim 1, Ward describes Spetrum Impulse Detection 550, not deconvolution. See Fig. 5 and Ward ¶ 0031. The fact that Ward does not describe deconvolution can be readily verified from the Ward disclosure in several ways. First, deconvolution requires operation on two distinct data functions. Ward shows only one data signal, which is represented in Figs. 6 and 7. Figure 7 is merely a conversion of the signal data of Fig. 6: There is no reason to deconvolve the data of Figs. 6 and 7 because the Figures represent the same data. Moreover, even if Fig. 7 was taken as a separate signal, the data of Figs 6 and 7 cannot be deconvolved because deconvolution requires two signals of the same variety. The fact that Figures 6 and 7 have different units on the axes shows that direct deconvolution of the data in those Figures is not appropriate. As explicitly stated in the Ward reference, Ward does not employ a deconvolution process as recited in claim 1, but rather employs a different approach — spectrum impulse detection.

Ward also manipulates a different data function than Applicants' claimed method. Ward begins with a time-domain data series (see ¶ 0020) and then performs a

Fourier transform. See Fig. 5, steps 500-520. Contrary to the suggestion in the Office Action, Figures 6 and 7 of Ward do not show a probability density function (PDF) as recited in Applicant's claim 1. Rather, Figures 6 and 7 show histograms that are the result of a Fourier transform. The label for the Y-Axis of Figure 6 is not probability density, which is the Y-Axis unit of a PDF, but rather is "jitter magnitude", the result of the Fourier transform performed in step 510 of Fig. 5. Thus, contrary to the suggestion in the Office Action, the manipulations described in paragraph 0036 et seq. are not performed upon a probability density function, as required by claim 1. Fig. 7 shows "hits" but does not appear to be a probability density function (compare Fig. 10) and in any case is not subject to a deconvolution process.

In sum, Ward does not discuss employing a deconvolution process on two probability density functions to separate random and deterministic jitter as recited in part (d) of claim 1. Moreover, Ward does not even contemplate two separate probability density functions which could be subject to the deconvolution process recited in part (d) of claim 1. Skafidas, Martone, and Dinsed fail to remedy the deficiencies of Ward. Applicants respectfully request reconsideration and withdrawal of the rejection of claim 1 under 35 U.S.C. §102.

Independent Claims 32, 63, 94, 98, 101, 106, 110, 113, 118, 122, and 125

In rejecting the other independent claims, the Office Action relied upon the reasoning referenced above regarding claim 1. Independent Claims 32, 63, 94, 98, 101, 106, 110, 113, 118, 122, and 125 recite determining unknown parameters by using a deconvolution process employed upon the probability density function based on the data and the probability density function based on the convolution model.

Consistent with the above discussion, Applicants submit that claims 32, 63, 94, 98, 101, 106, 110, 113, 118, 122, and 125 are patentable over Ward. Applicants respectfully request reconsideration and withdrawal of the rejection of these claims.

Dependent claims

The remaining claims rejected under § 102 depend from an allowable independent claim. The dependent claims are allowable at least for this reason.

Rejections Under 35 U.S.C. §103(a)

The remaining claims stand rejected under 35 U.S.C. §103(a). Applicants respectfully traverse these rejections. The premise underlying the rejection of these claims is that Ward actually teaches determining unknown parameters by using a deconvolution process as recited in the independent claims. As has been discussed, this limitation is not taught or suggested by Ward. Moreover, Skafidas, Martone, and Dinsel neither alone nor in combination teach or suggest this limitation.

In addition, to make out a *prima facie* case of obviousness under 35 U.S.C. § 103(a), there must exist some motivation, either generally available to one of ordinary skill in the art or expressly stated in the prior art, to modify the known prior art to arrive at the claimed invention. No motivation has been stated to modify Ward (or Skafidas, Martone, or Dinsel) to include employing a deconvolution process upon probability density functions as recited in the claims. Further, no such motivation is articulated within any of those references themselves. Thus, Ward, Skafidas, Martone, and Dinsel are unable to support a rejection, either alone or in concert, under 35 U.S.C. §103(a). For the foregoing reason, Applicants respectfully request withdrawal of the rejection of the remaining claims under 35 U.S.C. §103(a).

Conclusion

Claims 1-129 remain pending in the application. These claims are believed to be allowable for the reasons set forth above. This amendment is believed to be responsive to all points raised in the Office Action. Accordingly, Applicants respectfully request prompt reconsideration, allowance, and passage of the application to issue. Should the Examiner have any remaining questions or concerns, the Examiner is urged to contact Nick Johns at 612.371.5207 or the undersigned by telephone at the number below to expeditiously resolve such concerns.

Respectfully submitted,

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Date: April 21, 2004

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